

# The microIOC Family



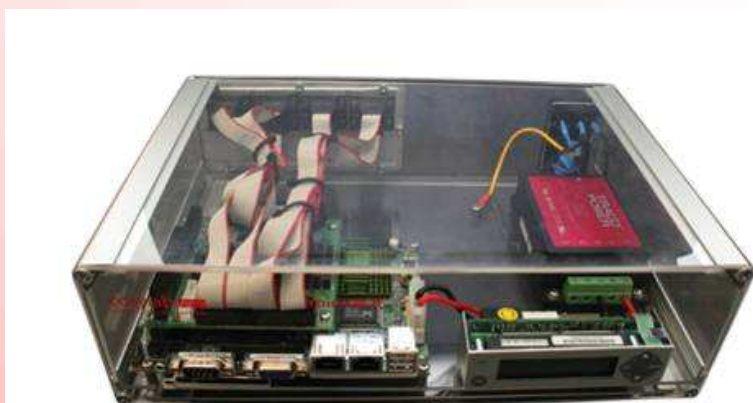
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EPICS Collaboration Meeting  
Argonne National Laboratory  
June 2006

## microIOC – A Quick Overview

- Compact x86 (PC-104) based IOC
- Reliable power supply (55 years MTBF)
- No moving parts (boots from CF)
- 2 Ethernet interfaces
- Number of different I/O extension cards
- Rack mount (19") or desktop (9" or 13") cases



## Benefits

- completely stand-alone, no VME/PCI or boot PC
  - Use it where VME would be overkill
- plug&play: connect cables and it works
- standard components and software
- one IOC for integration of wide device spectrum
  - beamlines



## Stand-alone microIOC

- Suitable for EPICS integration of serial devices
  - RS232 (up to 32 ports)
  - R422, RS485 (up to 12 ports)
  - GPIB
- Analog and digital I/O integration
  - several possibilities
- IP devices integration (e.g. PLC)
  - separate device network, no excessive TCP traffic comes to device
- Combination of different I/O interfaces



## Stand-alone microIOC

**RS 232/422/485**



**Analog/Digital I/O**



**GPIB**



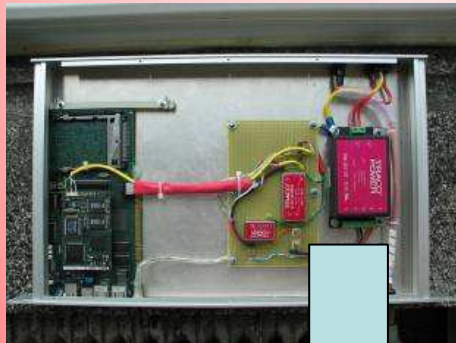
- ssh console
- local console
- RS232 console



## microIOC is Evolving

- microIOC as a platform for CS solutions
- microIOC embedded in instruments/devices
  - or the other way around
- New developments with microIOC in mind

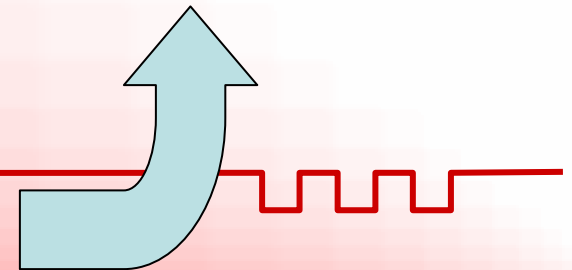
First customer: SLS  
In 2003



First mass order: ASP  
Spring 2005 (25pcs)

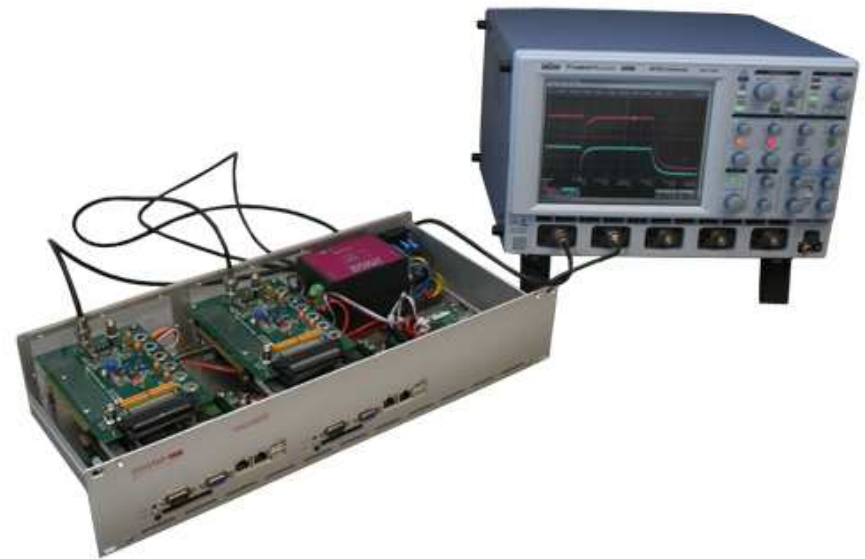
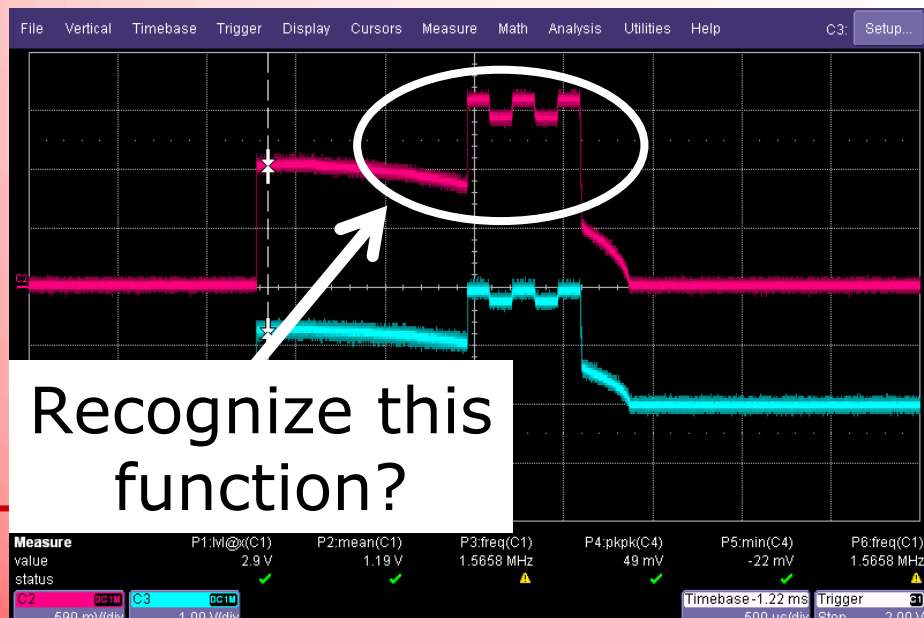


LOCO system: BESSY PTB  
Late 2005  
2 microIOCs, 150 LOCOs



## Function Generator

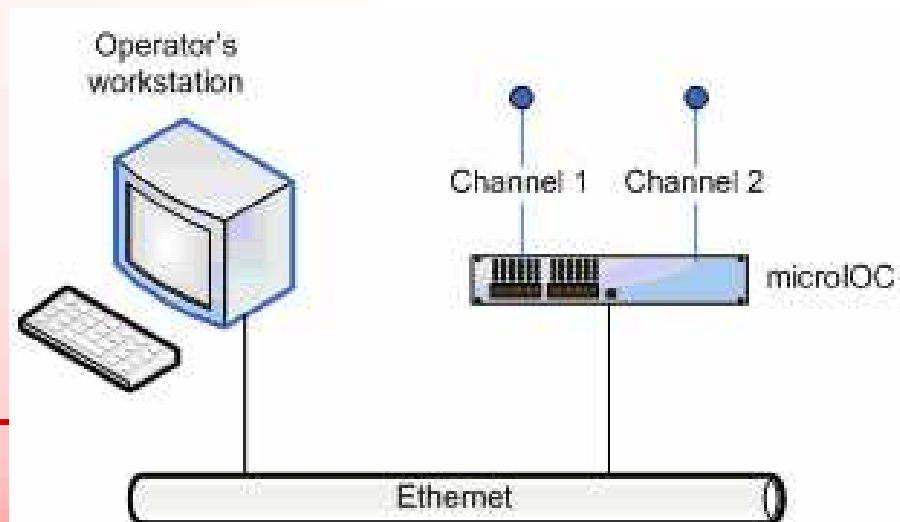
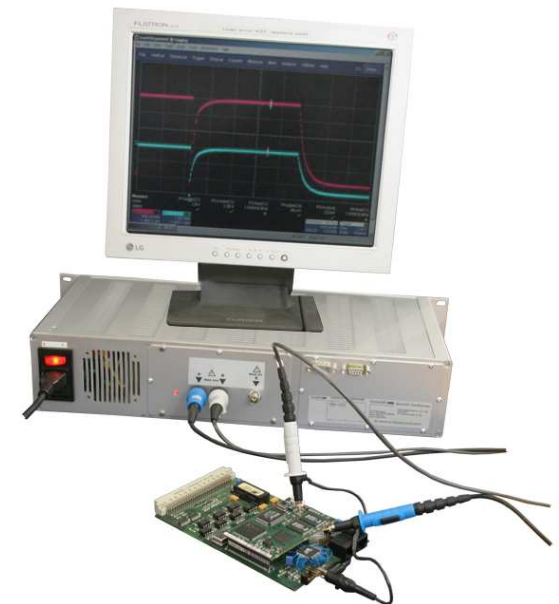
- Arbitrary function generator
- 12, 14 or 16 bit resolution
- Sine and square waveforms up to 15 MHz
- Up to 40Msa/s, up to  $10^9$  points arbitrary waveform
- PC Waveform Generator application for waveform preparation and verification





## CosyScope

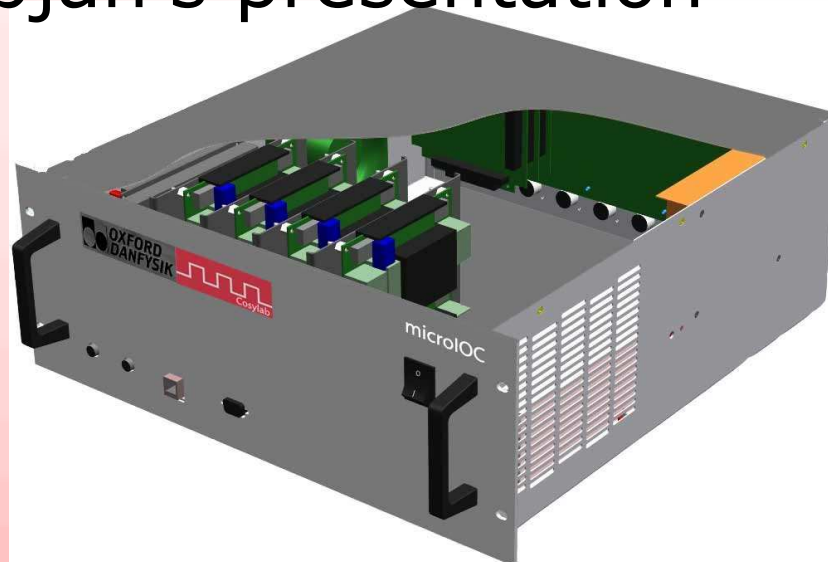
- Observe signals over the network via EPICS
- Distributed signal acquisition
  - signal comparison
  - troubleshooting
- 2 channels per microIOC
- Triggering:
  - Channel threshold
  - External trigger





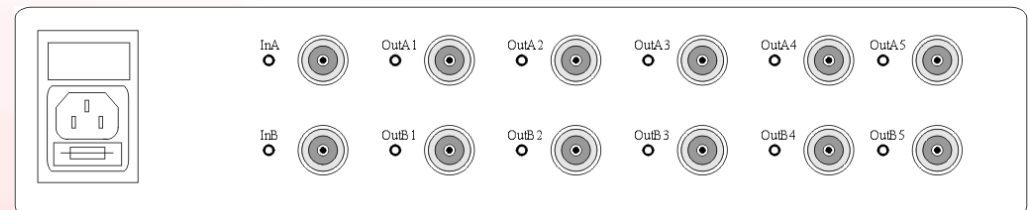
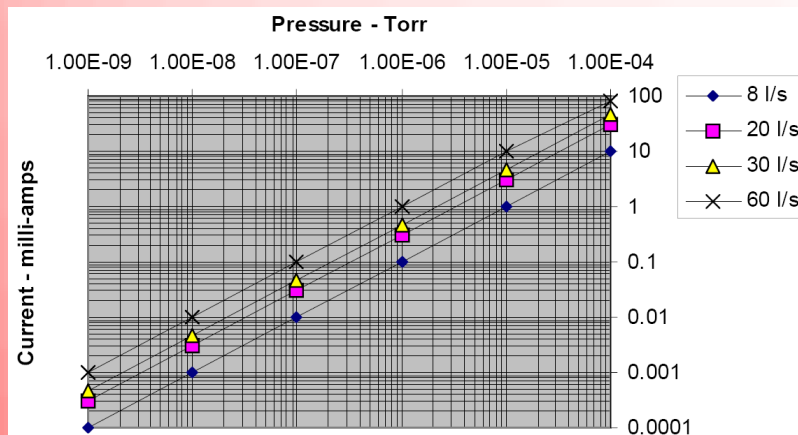
## MCS-8 Motor Box

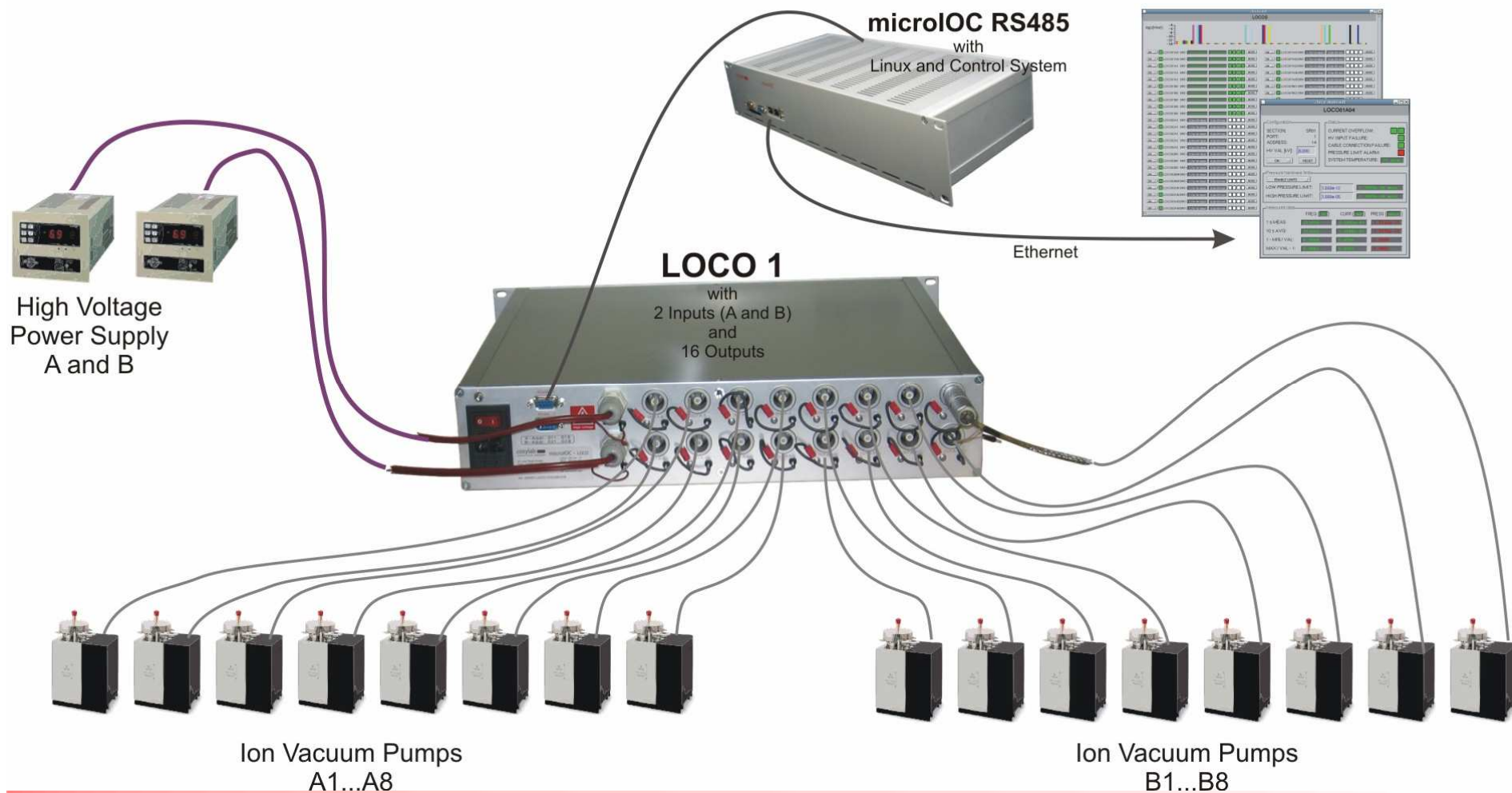
- microIOC controlling 8-axis PMAC motion controller
- EPICS integration
- Rok Sabjan's presentation



# LOCO System

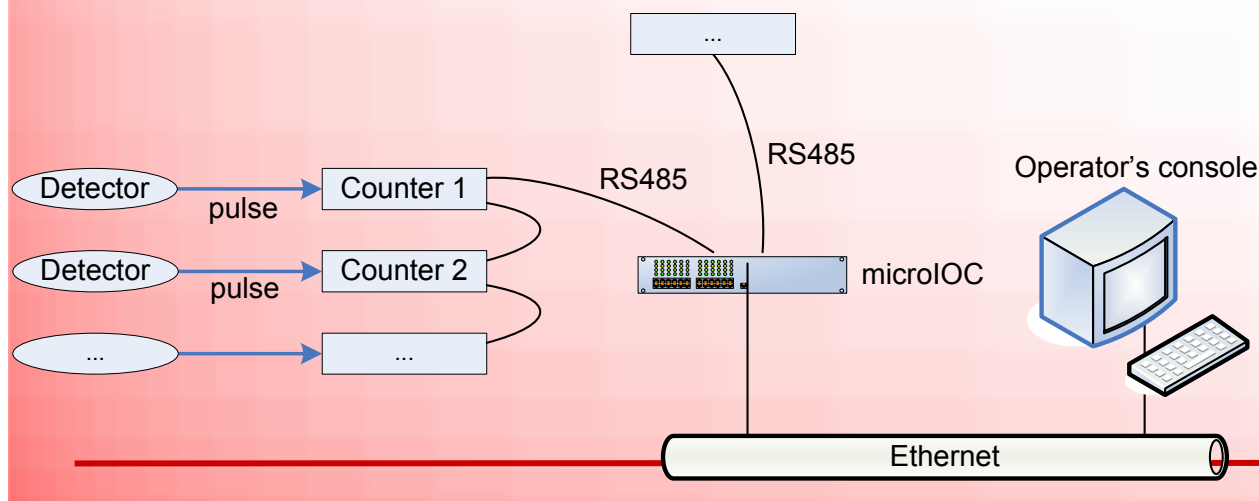
- Logarithmic Converter
  - connect several vacuum pumps on single HV power supply
  - read the pressure from each of the pumps
- microIOC for controlling the LOCO boards
  - count -> current -> pressure calculation
  - EPICS interface





## Beam Loss Monitor System

- Cosylab counter controller for Bergoz BLM sensor
  - Powered over Ethernet, RS485 or external PS
  - Up to 2 sensors
  - Can be daisy chained
- microIOC with capability of both controlling and powering the counter controller
- See the demo in the exhibition hour!



## Misc. microIOC News

- Development environment (microIOC sandbox)
  - compiling applications
  - full EPICS support
  - deployment functionality
  - standard linux (debian) tools
  - suitable for integration into larger tool
- Current amplifier
  - current range 100pA to 10mA
  - power over Ethernet or RS485
  - can be daisy chained
- Dual case
  - 2 microIOCs in 19"x2" rackmount case
  - saves space
  - possible redundancy solutions



## New Instruments in Integration Phase

- Delay Generator
  - 8 precisely controlled delayed channels
  - 0 to 1s delay
  - 0.5ns pulse width resolution
  - EPICS integration out of the box
  - DG535 alternative
- Bergoz analog electronics
  - AC Current Transformer
  - Log Ratio BPM
  - Multiplexed BPM
  - BPM Analog Front End
  - Beam Charge Monitor
- **We are always open to new suggestions**





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